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10/814,081	03/31/2004	Wu Chou	633-001us	5517
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DEMONT & BREYER, LLC			YEN, ERIC L	
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HOLMDEL, NJ 07733			ART UNIT	PAPER NUMBER
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

docketing@dblaw.com

<b>Office Action Summary</b>	<b>Application No.</b> 10/814,081	<b>Applicant(s)</b> CHOU ET AL.
	<b>Examiner</b> ERIC YEN	<b>Art Unit</b> 2626

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
  - If no period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
  - Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) Responsive to communication(s) filed on 26 April 2010.
- 2a) This action is FINAL.      2b) This action is non-final.
- 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) Claim(s) 1 and 3-18 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) Claim(s) \_\_\_\_\_ is/are allowed.
- 6) Claim(s) 1 and 3-18 is/are rejected.
- 7) Claim(s) \_\_\_\_\_ is/are objected to.
- 8) Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) The specification is objected to by the Examiner.
- 10) The drawing(s) filed on \_\_\_\_\_ is/are: a) accepted or b) objected to by the Examiner.  
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) All    b) Some \* c) None of:
1. Certified copies of the priority documents have been received.
  2. Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- 1) Notice of References Cited (PTO-892)  
 2) Notice of Draftsperson's Patent Drawing Review (PTO-948)  
 3) Information Disclosure Statement(s) (PTO/SB/08)  
 Paper No(s)/Mail Date \_\_\_\_\_
- 4) Interview Summary (PTO-413)  
 Paper No(s)/Mail Date \_\_\_\_\_
- 5) Notice of Informal Patent Application  
 6) Other: \_\_\_\_\_

**DETAILED ACTION**

***Response to Amendment***

1. In response to the Final Office Action mailed 3/16/10, applicant has submitted an amendment and Request for Continued Examination filed 4/26/10.

Claims 1 and 3-18 have been amended.

***Response to Arguments***

1. Applicant's arguments with respect to claims 1 and 3-18 have been considered but are moot in view of the new ground(s) of rejection.

The rejections below are based on Li who indeed are the same inventors as this application but still constitutes prior art with a priority date under 102(b) because it was published over a year before the filing of this application.

***Claim Rejections - 35 USC § 112***

2. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

3. Claims 1 and 3-18 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to

one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

As described by applicant in pages 9-11, all of the limitations in the amended claims are only disclosed in the Li-2003 reference which is neither a US Patent or Publication.

Under 37 CFR 1.57(c) incorporation by reference can only be by way of "an incorporation by reference to a US patent or US patent application publication, where "essential material" is material necessary to provide a written description of the claimed invention (1.57(c)(1)) and legal tests set forth in 1.57(c)(2)-(3).

In this case, the Li-2003 reference is a publication, which is neither a US patent or US patent application publication.

In this case none of the steps are described in the Specification of this application and are neither inherent nor generally known in the art and therefore the Specification does not enable the claims under 35 USC 112, 1st paragraph.

Additionally, there is no enabling description for "selecting a plurality of terms from the union of terms, based on an information-gain value of each term in the union of terms". Applicant references Li-2003 (Amendment, page 11) paragraph 1 of (presumably) Section 3 which states "not every word term has detailed information that is salient for natural language understanding". Section 3.1 further describes IG based term selection but does not describe anything about selecting multiple terms. The

closest portion of this section is the classification into one of N (where N logically includes numbers greater than 1) categories. While categories are, indeed, part of the matrix mentioned in page 3 (also cited by applicant in Amendment, page 11 as supporting this limitation), applicant has made a clear distinction between categories and terms in the description, and does not say anything about the selection of MULTIPLE (i.e. a plurality) TERMS.

Applicant's referenced paragraph which states "information based term selection calculates information gain values for each of a plurality of terms" (Specification, page 3, line 11) is directed to the use of information gain to select terms TO FORM THE MATRIX. Applicant's claim language refers to selecting the terms AFTER THE MATRIX HAS BEEN FORMED.

Applicant also references the lower right paragraph of the page of Li-2003 that first describes Section 3, which states "IG based term selection provides a unified approach to select salient features from multiple information sources", but nothing states that features are synonymous with terms nor that multiple information sources is the matrix formed using terms and word-classes.

This paragraph also references "Improving Latent Semantics Indexing Based Classifier with Information Gain" (previously cited) which also does not describe selecting multiple terms from the union of terms.

Applicant does indeed teach assorted concepts that may SUGGEST the claimed limitation but there are far too many inferences, alternative interpretations and other possible variations that can be and/or are derived from what actually is explicitly taught

in the Specification and/or any of the incorporated references. The cited portions discussed above AT MOST discuss assorted concepts used in independent explicitly taught functions (e.g. IG values to derive the matrix, selecting multiple categories, selecting only one category/term from the union/matrix) that applicant is asserting somehow collectively provides enough hints to amount to a teaching of the amended limitation.

This cannot constitute a teaching or enablement because it requires an excessive amount of creativity and guesswork in order to enable one of ordinary skill in the art to make and use the amended limitation and therefore the amended limitation "selecting a plurality of terms from the union of terms, wherein the selecting is based on an information-gain value of each term in the union of terms" is not supported. 35 USC 112, 1<sup>st</sup> paragraph requires at the very least that the written description must be FULL, CLEAR... and EXACT TERMS as to enable any person skill in the art to which it pertains... to make and use the same. Based on the above discussion, since there are inferences to be made and there is no explicit teaching of the newly claimed limitation, the Specification and references incorporated (which, again, must under rule 1.57 must be referenced to a US patent or patent application publication), the descriptions do not meet at least the full, clear, or exact requirements of 35 USC 112, 1st paragraph for enablement and therefore constitutes new matter.

Claims 5-6, 12, also incorporate the same issue because all of the described processes involving selection and information gain are directed to generating the

matrix/union and therefore there is no support for the terms ALREADY BEING IN THE UNION OF TERMS (necessarily the case because applicant claims "IN THE union of terms")

Claim 7 also incorporates this problem because applicant states "wherein the matrix results from the latent semantic indexing when the Specification and any incorporated references only describe performing LSI based on the matrix NOT THE OTHER WAY AROUND.

For the purposes of applying art the examiner has interpreted Claim 7 as not including "wherein the matrix results from the latent semantic indexing".

Claim 10 incorporates the same issue as Claim 7, and is interpreted such that the LSI uses the matrix and not that the matrix is derived from the LSI.

4. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

5. Claims 15-17 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claims 15-17 are directed to an apparatus but only recites what a processor-based device does, and not what the processor-based device is. Under IXPL Holdings

v. Amazon, 430 F.3d 1377, "reciting both an apparatus and a method of using that apparatus renders a claim indefinite under section 112". As currently claimed the function language does not have patentable weight and corresponding components performing the method steps must be amended into the claims if they are to be given patentable weight.

As discussed above, "selecting a plurality of terms from the union of terms, wherein the selecting is based on an information-gain value of each term in the union of terms" and so it is not clear if applicant even intended for this to be claimed.

For the purposes of applying art, the examiner has interpreted "selecting a plurality of terms from the union of terms, wherein the selecting is based on an information-gain value of each term in the union of terms" as -- selecting a plurality of terms, wherein the selecting is based on an information-gain value of each term – in accordance with the selection of terms to be included in the term-category matrix based on information gain (Specification, pages 11-12).

Similarly any reference to "in the union of terms" (e.g. in Claims 5-6) are interpreted as deleted from the claims for the purposes of applying art.

Claim 8 recites a second set of word-terms but does not recite doing anything with them or if they are even separate and distinct terms from any other word terms, and so it is not clear for what purpose or what function this limitation serves or if it is even supported by the Specification.

Claim 11 recites where a cell of a matrix comprises a classification function which makes no sense because a matrix cell is a data storage location and not a function.

***Claim Rejections - 35 USC § 103***

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

7. Claims 1, 3, 5-18, are rejected under 35 U.S.C. 103(a) as being unpatentable over Li et al. ("Improving Latent Semantic indexing Based Classifier With Information Gain"), hereafter Li.

As per Claim 1, 15, Li teaches a method (and corresponding apparatus) comprising: receiving, by a processor-based device, a communication that comprises a word that is a natural-language word ("natural language understanding... directing the user's call... matches a user's request", Section 4, Experimental Setup, paragraph 1; where users communicate by speaking in natural language which includes speaking natural language words)

generating by the processor-based device a union of terms comprising: (i) a first set of word-terms, and (ii) a set of word-classes ("term-document matrix M is formed by terms... selected term is mapped to a unique row vector and each category is mapped

to a unique column vector", Section 3, especially paragraph 3; where the matrix is formed by combining terms [i.e. word terms] and categories [word-classes])

selecting by the processor-based device a plurality of terms wherein the selecting is based on an information-gain value of each term ("term-document matrix... each selected term... IG based term selection is implemented... terms are selected and used in the term-document matrix based on their discriminative power", Section 3; where the terms selected are IG based and sorted by their individual values)

performing, by the processor-based device, latent semantic indexing upon the plurality of terms to determine a category of the word ("LSI classifier... categorize an unknown document... similarity... n-best categories", Section 3; "user's request", Section 4; where categorizing a document by consequence categorizes the word in that document).

As per Claim 3, 16, 18, Li teaches/suggests (along with its apparatus equivalent of Claim 16 and article of manufacture equivalent in Claim 18, where claim 18 includes the limitations of both Claims 1 and 3) routing by the processor-based device the communication to a particular one of a plurality of destination terminals of a communication system based on the category of the word, wherein the communication system comprises the processor-based device and the plurality of destination terminals ("routing... appropriate destination within a call center", Section 4; where the routing to destinations in the call-center/system based on the query's categorization, which includes categorizing the words in the query).

As per Claim 5, Li teaches selecting of the plurality of terms is further based on a percentile value applied to the respective information-gain values of the terms ("top p percentile... according to the IG score", Section 3).

As per Claim 6, Li teaches wherein the information gain value for each term indicates the average entropy variations over a plurality of possible categories for each term ("significance of the term based on the entropy variations of the categories, which relates to the perplexity of the classification task", Section 2; "literal terms... may not match those of a relevant document", Section 1, paragraph 1; "IG enhanced... classified... categorize an unknown document", Section 3; where the entropy variations are taught by Li to relate to perplexity and so an entropy calculation is also a perplexity calculation and Equation 1 describes the information gain value being calculated from entropy/perplexity. Also the subscript  $t_i$  at the end of Section 2 at least suggests that there is more than one term for which the information gain is calculated).

As per Claim 7, 17, Li teaches (along with its apparatus equivalent of Claim 17) wherein the category of the word is a cell in a term-category matrix ("cell... j-th category", Section 3).

As per Claim 8, Li teaches wherein the generating of the union of terms further comprises (iii) a second set of word-terms ("term-document matrix M is formed by

terms... selected term is mapped to a unique row vector and each category is mapped to a unique column vector", Section 3, especially paragraph 3; where applicant neither claims any function or distinction between the second set and the first set so even a subset of the terms exists because the first set used in the matrix is a bigger set. This reads on a second set of word-terms because a subset is distinct from its superset but is still a set and such a set exists because there are a number of terms greater than 1 used in the matrix and sets as generally understood are only entities with a certain number of elements, and the subset of the terms exist because its superset exists).

As per Claim 9, Li teaches wherein the union of terms is generated by interleaving individual word-terms with their corresponding word-classes ("cell... j-th category", Section 3; where the cells of the matrix correspond to both a word and a word class and so it "interleaves" them by providing them a common point).

As per Claim 10, Li teaches/suggests a method comprising: receiving, by a processor-based device, a communication that comprises a word that is a natural-language word ("natural language understanding... directing the user's call... matches a user's request", Section 4, Experimental Setup, paragraph 1; where users communicate by speaking in natural language which includes speaking natural language words) generating by the processor-based device a union of terms comprising: (i) a first set of word-terms, and (ii) a set of word-classes ("term-document matrix M is formed by terms... selected term is mapped to a unique row vector and each category is mapped

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to a unique column vector", Section 3, especially paragraph 3; where the matrix is formed by combining terms [i.e. word terms] and categories [word-classes])

selecting by the processor-based device a plurality of terms wherein the selecting is based on an information-gain value of each term ("term-document matrix... each selected term... IG based term selection is implemented... terms are selected and used in the term-document matrix based on their discriminative power", Section 3; where the terms selected are IG based and sorted by their individual values)

classifying the communication by utilizing a joint classifier upon the plurality of terms, wherein the joint classifier comprises at least one term-category matrix that results from the selecting based on information-gain values ("LSI classifier... categorize an unknown document... similarity... n-best categories", Section 3; "user's request", Section 4; where categorizing a document by consequence categorizes the word in that document, and it's a "joint" classifier in the sense that it jointly uses category and term information)

and applying latent semantic indexing to the plurality of terms ("LSI classifier... categorize an unknown document... similarity... n-best categories", Section 3; "user's request", Section 4)

As per Claim 11, Li teaches wherein a cell I,j, of the term-category matrix comprises classification by the processor-based device of an i-th selected term into a j-th category ("LSI classifier... categorize an unknown document... similarity... n-best categories", Section 3; "user's request", Section 4; where categories in the matrix are

among the j categories and categorizing a request including terms categorizes it into a category among the categories numbered by the values of j)

As per Claim 12, Li teaches/suggests a method comprising: receiving, by a processor-based device, a communication that comprises a word that is a natural-language word ("natural language understanding... directing the user's call... matches a user's request", Section 4, Experimental Setup, paragraph 1; where users communicate by speaking in natural language which includes speaking natural language words)

generating by the processor-based device a union of terms comprising: (i) a first set of word-terms, and (ii) a set of word-classes ("term-document matrix M is formed by terms... selected term is mapped to a unique row vector and each category is mapped to a unique column vector", Section 3, especially paragraph 3; where the matrix is formed by combining terms [i.e. word terms] and categories [word-classes])

selecting by the processor-based device a plurality of terms wherein the selecting is based on an information-gain value of each term ("term-document matrix... each selected term... IG based term selection is implemented... terms are selected and used in the term-document matrix based on their discriminative power", Section 3; where the terms selected are IG based and sorted by their individual values)

wherein the selecting comprises: i) calculating an information gain value for each term that corresponds to the word ("terms are selected and used... according to IG criterion... sort the terms", Section 3; "terms in documents", Section 1, paragraph 1; where sorting terms by their IG values means that each term had its IG value calculated

such that they can be sorted, and the terms are in documents that communicate information [received at the input to the classification system], and documents contain words and so the terms in this context are words)

- ii) sorting the terms in the union of terms in a descending order of information gain values ("sort the terms by their IG values in descending order", Section 3)
- iii) setting a threshold of an information gain value corresponding to a specified percentile ("select top p percentile of terms according to the IG score distribution", Section 3; where taking the top p percentile sets the lowest of that p percentile as the threshold IG score)
- iv) selecting the terms having an information gain value greater than or equal to the threshold to generate a plurality of terms ("select top p percentile of terms", Section 3; where taking the top p percentile takes all terms exceeding the lowest IG value in that percentile).

As per Claim 13, Li teaches wherein the selected terms in the plurality of terms are processed by the processor-based device to form a term-category matrix from which a joint classifier determines at least one or more categories for the word ("construct the term-document matrix... based on terms selected from... categorize... enhanced term-document matrix", Section 3; "user's request", Section 4; where the LSI uses the matrix to categorize a word in a user's request).

As per Claim 14, Li teaches performing by a joint classifier joint latent semantic indexing upon the plurality of terms to determine a category for the word, wherein the processor-based device comprises the joint classifier ("latent semantic indexing", Abstract; "conventional approach, the term-document matrix... additional module of IG", Section 3; where the "joint" classification uses a combination of term-document matrix and IG).

1. Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over Li, as applied to Claim 1, above, and further in view of Sakai et al. (US 7,099,819), hereafter Sakai.

As per Claim 4, Li fails to teach wherein an automatic word class clustering algorithm is utilized to generate the word-classes.

Sakai teaches wherein an automatic word class clustering algorithm is utilized to generate the word-classes ("category decision rules... each text is classified to a category according to the category decision rule", col. 3, lines 35-50; "automatically creates a new category", col. 6, line 53 – col. 7, line 5; "if a cluster consisting of a large number of texts... new category to which this cluster is classified", col. 6, lines 34-40; "cluster generation unit", col. 6, lines 7-24; where the clustering is automatically performed and whose results is used for a new word class, and so it is an automatic word class clustering algorithm and is used to generate new word class [i.e., category rules/information]).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to modify Li to include the teaching of Sakai of wherein an automatic word class clustering algorithm is utilized to generate the word-classes in order to provide a system is capable of adapting and improving itself, as described by Sakai (col. 6, line 53 - col. 7, line 5).

***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to ERIC YEN whose telephone number is (571)272-4249. The examiner can normally be reached on M-F 7:30-4:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Richemond Dorvil can be reached on 571-272-7602. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

EY 6/2/10  
/Eric Yen/  
Examiner, Art Unit 2626